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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,532	07/20/2001	Kie Y. Ahn	303.377US3	1731

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 03/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/909,532

Applicant(s)

AHN ET AL.

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 49-77 and 79-83 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 49-77 and 79-83 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- ☐ Interview Summary (PTO-413) Paper No(s) _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

DETAILED ACTION

1. This Office Action is in response to the Request for Continued Examination and the Terminal Disclaimer filed February 10, 2003.

Claims 1-48 and 78 are canceled.

Claims 49-77 and 79-83 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 10, 2003 has been entered.

Information Disclosure Statement

3. The information disclosure statement filed February 10, 2003 has been considered.

Terminal Disclaimer

4. The terminal disclaimer filed on February 10, 2003 disclaiming the terminal portion of any patent granted on this application, which would extend beyond the expiration date of U.S. Patent No. 6,350,704 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 49-77 and 79-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sigh et al. in view of Havemann et al. (U.S. 5,488,015).

Sigh et al. discloses coating at least a portion of a surface of a substrate with a mixture of oxide and carbon sources and transforming the mixture into a porous oxide insulator on the integrated circuit. Sigh et al. also teaches silicon oxycarbides having an average pore size of ~ 30 angstroms, the silicon oxycarbides display a greater thermal stability of surface area than pure silica (page 2696-2704).

In addition, Sigh et al. teaches using methyldimethosylsilane (MDMS), tetraethoxysilane (TEOS), and silicon alkoxides (page 2696). The step of transforming includes heating between 450° and 1200° C at 0.5 hours to 24 hours, drying and pirolizing in argon atmosphere, respectively is disclosed, for example, on page 2698, column 1, first paragraph.

Sigh et al. fails to show providing a plurality of circuit elements on a substrate, forming vias in the porous oxycarbide dielectric layer, forming metal layers in the vias, the dielectric constant being less than approximately 2, and using a CMP process to obtain a desired thickness of the silicon oxycarbide layer. However, Havemann et al. teaches providing a plurality of circuit elements on a substrate, forming

vias in the porous dielectric layer, forming metal layers in the vias, using a CMP process to obtain a desired thickness of the porous dielectric (Figs. 3A-8D, col. 6, lines 15-25, col. 7, lines 20-36, col. 8, lines 18-65, col. 10, lines 43-45).

Havemann et al. also shows the porous layer having a dielectric constant of less than 2.0 (col. 2, lines 33-40) and the porous dielectric layer should contain pores radius at least an order of magnitude of 10 nanometers (100 Angstroms) (col. 4, lines 55-62).

Since Sigh et al. and Havemann et al. are both from the same field of endeavor of forming porous dielectric layers, the purpose disclosed by Havemann et al. would have been recognized in the pertinent art of Sigh et al.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Sigh et al. reference by including the teaching of Havemann et al. The modification would complete a process of making oxycarbide porous layers that would be more thermal stable than conventional porous silica layers and would be employed to reduce capacitance between conductors (Singh et al., page 2704; Havemann et al., col. 2, lines 35-40).

Response to Arguments

6. The Double Patenting Rejection has been withdrawn in view of the Terminal Disclaimer filed February 10, 2003.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is (703) 305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached on (703) 308-4905. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

Maria Guerrero
Maria Guerrero

Patent examiner

March 13, 2003